Identifying research priorities for digital technology in mental healthcare: Results of the James Lind Alliance Priority Setting Partnership

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Summary

Digital technology, including the use of internet, smartphones and wearables, holds the promise to bridge the mental health treatment gap by offering a more accessible, potentially less stigmatising, flexible and tailored approach to mental healthcare. However, the evidence-base for digital mental health interventions and demonstration of clinical- and cost-effectiveness in real-world settings remains inadequate. The James Lind Alliance (JLA) Priority Setting Partnership (PSP) for digital technology in mental healthcare was established to identify research priorities that reflected the perspectives and unmet needs of people with lived experience of mental health problems, mental health service users, their carers, and healthcare practitioners. 644 participants contributed over 1350 separate questions, which were reduced by qualitative thematic analysis into six overarching themes. Following removal of out of scope questions and a comprehensive search of existing evidence, 134 questions were verified as uncertainties suitable for research. These questions were then ranked online and in workshops by 628 participants to produce a shortlist of 26. The top ten research priorities were identified by consensus at a stakeholder workshop. The top ten priorities should inform research policy and funding in this field. Identified priorities primarily relate to the safety and efficacy of digital technology interventions in comparison with face to face interventions, evidence of population reach, mechanisms of therapeutic change, and how best to optimize the effectiveness of digital interventions in combination with human support.

Introduction

Mental health disorders constitute the single largest source of health-related economic burden worldwide.[1-3] Common disorders, including depression or anxiety, contribute most to this burden, with over one in four people affected with these conditions at some point in their lives.[4, 5] Globally, there is increasing pressure on healthcare systems to provide accessible evidence-based and cost-effective solutions to people affected by mental health disorders.[6] In the UK, demand for mental health treatment exceeds available NHS resources, with only one third of people with common mental health disorders receiving help from the NHS.[5]

The recent WPA - Lancet Psychiatry Commission on the Future of Psychiatry: Digital Psychiatry section[7] highlighted the potential for digital technology to bridge the mental health treatment gap by offering a more accessible and, potentially less stigmatising, flexible and tailored approaches to mental healthcare.[6, 8, 9] Digital technologies, including the Internet, smartphones and wearables can connect patients, services and health data in novel ways not previously available and through combination with existing treatments. In the UK, 88% of adults have Internet access at home and 75% own a smartphone.[10] It is estimated that by 2020 80% of adults worldwide will own a smartphone.[11] With more people connected to the Internet than ever before and in possession of different digital technology platforms (e.g. smartphone, tablets, laptops, wearables), there is potential to reach a broader population at a time when mental health services are increasingly strained. Increasing access to digital services is a policy undertaking of the UK Government's Five Year Forward View and the UK Government has recently invested £67M for digital technology interventions in the NHS Increasing Access to Psychological Therapies (IAPT) programme.[12, 13]

A potential unintended consequence of using digital technology in mental healthcare is that it could create a 'digital divide', i.e. excluding those who are not engaged with technology for reasons of choice (self-exclusion), cost, age group, geography (e.g. limited rural broadband coverage), lack of confidence or digital literacy.[14] Furthermore, certain mental health conditions such as depression, paranoia or psychosis may make it more difficult for a person to engage with, or trust, digital technology.[15] There is also a risk of 'technology push' where commercial companies seek a mental health application to fit their technology – as opposed to digital interventions designed to address the unmet needs and aspirations of people with mental health conditions.[8]

To date, research has demonstrated the promise, but also the limitations, of various mental health technologies, including Internet-delivered cognitive behaviour therapy (iCBT) for various mental health conditions.[16-20] However, the speed of digital technology development threatens to outstrip the pace of traditional research evaluation methods, in particular randomised controlled trials, and hence presents challenges for developing faster, robust, evaluation methods.[21] There is also evidence that the benefits of digital mental health interventions reported in efficacy trials may fail to translate into real-world clinical settings and populations.[7, 9, 19] Furthermore, with many thousands of commercially developed, and largely unregulated, mental health apps now available, there are significant concerns about the lack of evidence of safety, usability, confidentiality, clinical- and cost-effectiveness.[7] As a result, there is a real danger of digital mental healthcare policy and practice moving ahead of its evidence-base, with a resulting loss of public and professional confidence and trust.[7, 22-24]

To date, the mental health digital technology research agenda has largely been influenced by the research community, technology developers and health policy makers, with little reference to, or input from, people with mental health problems, their families and carers or non-academic clinicians. However, it is essential for avoiding harms, increasing benefit and sustaining impact that user needs and priorities drive digital technology development in mental health.[7] Furthermore, publically funded research and healthcare systems must prioritise questions for research that matter primarily to patients, their families and carers, and healthcare professionals and providers.[25] Their interests may differ widely from academics, researchers and industry, who are typically the individuals who set the research agenda.[26] The recent WPA - Lancet Psychiatry Commission on the Future of Psychiatry: Digital Psychiatry section emphasised the importance of listening to the voice of patients and clinicians; "How to ensure that both patient and psychiatrist voices are heard effectively is a topic for further research, but it might be the most important, and currently underappreciated step needed for digital psychiatry to advance".[7]

Over the last decade, inclusive methods pioneered by the James Lind Alliance (JLA), as part of the National Institute of Health Research (NIHR), have been developed for identifying priorities for medical research that are of importance primarily to patients and healthcare providers.[28] The JLA research priority setting partnerships (PSP) use an established methodology to bring together on a level playing field people with lived-experience of health conditions with healthcare practitioners. Each PSP produces a 'Top 10' list, showing the research questions considered highly important to stakeholders. The JLA have also replicated this process in running PSPs in other countries outside the UK, including nine PSPs in in Canada and two PSPs respectively in The Netherlands and Germany.[27]

The JLA Priority Setting Partnership (PSP) 'Digital Technology for Mental Health: Asking the Right Questions' was established in October 2016 to bring together people with personal lived experience of a mental health condition, their families and carers and healthcare providers, to identify unanswered questions and ultimately prioritise the top ten questions deemed the most important for digital technology in mental healthcare. To our knowledge, this is the first time that well-validated participatory methods involving patients, families, carers and healthcare professionals have been used to identify research priorities for digital technology in mental healthcare.

Methods

The JLA have developed a step-by-step guide outlining the processes and methods involved in developing priority setting partnerships (PSP) to systematically identify and prioritise unanswered questions in health research.[28] These guidelines are well-established, can be adapted to meet the specific requirements of a PSP, and have been applied to more than 50 PSPs to date across many different health topics, including treatment uncertainties for acne,[29] research into miscarriage,[30] and to identify research priorities for depression,[31] bipolar disorder, dementia and schizophrenia. These JLA Guidelines were adhered to for this digital mental health PSP.

Stage 1: Establishing PSP and defining project scope

The National Institute of Health Research (NIHR) MindTech MedTech Co-operative (MindTech) proposed the need for prioritising research questions about digital technology for mental health in February 2016 and invited relevant organisations and key experts in the field to join the collaboration to establish a JLA PSP. A steering group (SG) was established to oversee and guide the PSP and comprised people with personal experience of mental health problems, carers and health and social care practitioners, with additional knowledge and expertise provided by representatives of key UK mental health charities and researchers (see Table 1). Non-clinical researchers and mental health charity representatives took part in SG discussions, but decisions were only made by a quorum of at least two people with lived experience of mental health problems or caring for others and at least two health and social care practitioners. Developers of digital technologies for mental health and people with commercial interests in the field were excluded from the SG. The SGs were chaired by a JLA advisor (SR, October 2016 - June 2017; TAG, June 2017 - March 2018).

The PSP protocol was agreed and published on the PSP and JLA websites; the project then followed the five-stage process described by the JLA,[28] as shown in Figure 1.

(Table 1 here)

(Figure 1 here)

The definition of 'digital technologies' used by this PSP is presented in Figure 2 (Panel), this definition aligns with published research into digital healthcare interventions and technologies.[32] Because of the need to limit the scope of the PSP to ensure a manageable project, it was decided that the general impacts of digital technology were outside scope of the PSP. However, it was agreed to include in scope both the positive and negative effects of digital technologies when the intended use was to benefit people's mental health, regardless of whether the technology platform was designed specifically as a health intervention (for example, peer support via social media such as Twitter or Facebook). The final statement of scope agreed for the PSP is presented in the full protocol (see Appendix 1).

(Figure 2 here)

Stage 2: Gathering and identifying questions (1st survey)

The first survey was created in Survey Monkey and was open from 28 March to 5 July 2017, with additional face-to-face workshops and a 'Tweet Chat' also conducted during this time. The survey consisted of an explanation of what participants were being invited to do, an embedded link to the explanatory PSP film on YouTube (watch the film here), the primary question for gathering uncertainties, and demographic questions. The survey was reviewed by the SG and piloted by five people with personal experience of mental health problems and four health and social care professionals.

In the survey, participants were asked: '*What questions do you have about using digital technology for mental health problems*?' Respondents were reminded these were questions for research and asked to contribute up to three questions. The project website directed people to the survey and the link was also distributed by the SG and wider partners across networks and contacts. We prepared newsletter articles and blog posts, which were shared widely by a wide range of organisations. The Mental Elf, a leading UK blogging website run by mental health experts, featured a blog at the launch of the survey and social media channels were used extensively to publicise the survey.

Two other methods were adopted to gather questions: (i) Five national workshops ran in-person, specifically with groups identified as less confident with digital technology, (ii) a 'Tweet Chat' with a community using social media for professional development. The Tweet Chat was hosted by the @WeMHNurses online community (a host website of Twitter Chats aimed predominantly at nurses, see website) and took place on Monday 5 June 2017, 8-9pm.

The demographic profile of respondents was reviewed by the SG to check on the range of people participating midway through the survey. It was noted that we needed to reach more young people, people in the devolved nations of the UK (Wales, Scotland, and Northern Ireland), older people, more men and more people from diverse ethnic groups. Strategies were implemented for reaching these groups, including identifying specific organisations and groups to reach out to as well as building on the strong links within partner organisations (for example, the McPin Foundation invited younger people on their mailing list to participate).

In addition, we identified relevant research recommendations from previous JLA PSPs in mental health, as well as from NICE (National Institute for Health and Care Excellence) and SIGN (Scottish Intercollegiate Guidelines Network) treatment guidelines (see Appendix 2 for details on guidelines inspected).

Stage 3: Reducing the questions and processing uncertainties

The purpose of this stage of the PSP was to review the questions submitted, remove 'out of scope' questions, create a list of unique researchable questions and check if any of the unique researchable questions had already been answered through prior research. An organising framework to categorise the remaining questions was developed, following a processes of qualitative data analysis.[33] Six overarching themes emerged during inductive thematic analysis using NVivo software, in which common elements in questions (raw suggestions) were identified relating to digital technology use in mental health (See Appendix 3). To pilot the approach, two researchers independently coded 90 questions and compared the category labels. Disagreements were resolved through discussion. This initial framework was tested with further questions. At each stage, further refinements were made and an overarching framework developed to cluster the individual category labels. The work was carried out by researchers (LS, SS, KE), the MindTech Team and Minervation (a UK-based organisation specialising in producing evidence-based healthcare information), with each stage reviewed and approved by a quorate sub-group of the SG (called the data management sub-group).

Checking existing evidence

In order to check whether questions had already been answered by research, a database of relevant literature was developed using Mendeley software.[34] This database was called Current Overview of Published Evidence (COPE). To compile COPE, the Cochrane Common Mental Disorders Group Information Specialist, SD, ran a search of databases (Ovid Medline; Embase; PsycINFO; The Cochrane Library) as well as a series of specific (pragmatic) searches of databases due to limitations in the search functionality and idiosyncrasies of each platform (Epistemonikos; Health Evidence; DoPHER; PROSPERO) (see Appendix 1 for details of the screening process). We used systematic processes to categorise and format each relevant systematic review involving a digital technology intervention for use in mental health care or support, in order to make these searchable and accessible in Mendeley. We marked ('tagged') each reference with a unique identifier relating to the six overarching themes, allowing us to search the key components of a submitted unique question and assess whether any high-quality, published systematic reviews had answered any of the questions.

For each unique researchable question, the COPE database was checked for current evidence and the results of each search recorded. Where at least one relevant critically reviewed high-quality, up-to-date systematic review was identified that answered a question, this was removed from the potential indicative questions list. The remaining questions were confirmed as 'verified uncertainties' and were put forward for the interim prioritisation stage.

Stage 4: Interim prioritisation (2nd survey)

The interim prioritisation survey was open from 28 November 2017 to 15 February 2018. The aim was to rank the verified uncertainties in order of those considered most important by people with personal experience of mental health problems, their carers and health and social care practitioners. The refined set of questions were entered into a new online survey using Optimal Card Sort methodology and participants were invited to select the ten questions important to them, with the option to identify the three most important questions from their top ten.[35] As over 130 verified uncertainties remained at this stage, the SG decided to reduce the response burden by presenting each participant with a random sample of 45 questions presented in a random order. The survey was hosted on the project website and participants were invited by partner organisations and via newsletters, online and social media campaigns.

Questions from this stage were ranked based on the frequency they had been chosen; questions identified in participants' 'top ten' lists were given one point, questions identified in the 'top three' lists were given two points. The weighted analysis (all top three questions given two points) was compared to the unweighted analysis (one point) and a sensitivity check was conducted. Though we had initially intended to identify a 'top 25', results showed that not all participants identified a 'top three'; one question was ranked quite highly in the unweighted list (top ten), only to fall to number 26 when compared with the weighted list (top three). The SG agreed by consensus to adopt the aggregate question list including all 26 questions.

Stage 5: Priority setting workshop

Participants were invited to the final workshop held at the McPin Foundation in London. Participants included SG members, people with personal experience of mental health problems, carers, and health and social care professionals.

Prior to the workshop, participants prioritised the top 26 questions. This ensured familiarity with the questions and their personal preferences before the workshop. The workshop was facilitated by three JLA advisors (TAG, KC and TE), who chaired the small group activity. The workshop used a nominal group technique, with small and large groups. This facilitated process helps to prevent dominance of views by individual participants/particular perspectives, and encourage quieter members to participate. The small groups were predetermined to ensure balance of people with lived experience of mental health problems, carers and health and social care practitioners, as well as people who had been on the SG.

Priority setting was spread over the day, and had four stages. In the first stage participants were split into three groups, and each participant was invited to talk about their highest and lowest priorities from their pre-workshop prioritisation, with time allowed for discussion once everyone had their say. In the second stage the same small groups were asked to rank all 26 questions based on their stage 1 discussion. Each question was printed on an A4 card and laid on a table, enabling physical interaction in placing the question in a ranked order. The rankings from each group were then combined. In the third stage, participants were divided into three different groups again balanced for participant background, and presented with the combined rankings. Participants were asked to focus on whether they thought the right questions were in the top ten and were given the opportunity to make changes to the order of questions through discussion. In the fourth and final stage, the rankings were

combined and discussed as a whole group. When agreements could not be found by consensus, agreement was reached by raised-hands voting.

Results

Stage 2: Gathering and identifying questions (1st survey)

A total of 644 participants took part in the first survey. 583 participants completed the online survey, 28 took part in the Tweet Chat and 33 attended the face-to-face workshops. Workshop participants completed printed copies of the survey, which were manually entered into the online Survey Monkey results, and numbers were included in the total number of participants.

A total of 1,365 online and workshop submissions were 'split' (sometimes more than three questions were asked by participants, requiring them to be separated) to give a total of 1,471 questions. Fifty-eight other questions were identified from the Tweet Chat and NICE and SIGN guidelines, giving a total of 1,529 questions.

Stage 3: Reducing the questions and processing uncertainties

The 1,529 questions submitted in the first survey (called 'raw suggestions') were then reviewed and any that fell out of scope of the PSP, or were considered too vague, were removed (n=160) leaving 1,369 questions (see Figure 1). The raw suggestions were then coded into the framework resulting in six overarching themes: 1. Access, 2. Audience, 3. Rights, 4. Delivery, 5. Risks and 6. Outcomes (see Appendix 3). The raw suggestions in each section of the framework were reviewed for similarity and were combined and rephrased into summary questions. Through this process of thematic analysis and clustering of raw suggestions of similar themes into overarching questions, there were a total of 369 'indicative questions' formulated.

Questions were removed if they were too broad, not researchable or were simply information seeking e.g. 'How do we identify which digital interventions will work best for whom?', deemed policy or quality-related questions e.g. 'How do apps that monitor adherence (e.g. to treatment) ensure that the person for whom it was intended completes set tasks?' or were questions asking for information about, or access to, digital technology in general e.g. 'What existing online sources of support (e.g. therapy or counselling) are available for people with mental health conditions?'. These questions, totalling 260, were removed from the longer list, leaving 137 potential questions for interim prioritisation. Only three questions of the 137 were considered 'answered' by the systematic review evidence found in COPE, with 134 questions remaining as 'verified uncertainties' (See Appendix 4 for the list of questions answered by evidence in COPE). These 134 questions were then entered into the interim prioritisation survey in order to identify the top 25 questions considered most important by participants.

Stage 4: Interim prioritisation (2nd survey)

The 360 people from the first survey who opted into future communications were sent a personal invitation to take part. 615 participants completed the 2nd online interim prioritisation survey. Repeat face-to-face workshops, following a similar format were held with two organisations: one at the People's Forum and the Involvement Centre at Glenfield Hospital, Leicester, and another at Nottinghamshire Healthcare NHS Foundation Trust, with 13 participants taking part and completing printed copies of the survey. In total, 628 participants completed the interim prioritisation survey.

Characteristics of survey respondents

The characteristics of the first and second survey respondents is summarised in Table 2. The majority of respondents were female (1st survey n= 416 [69%]; 2nd survey n=433 [70%]), and were in the in the 20-54 age band (1st survey n=405 [67%]; 2nd survey n=447 [73%]). Just over half of respondents had lived experience of mental health problems (1st survey n=353 [57%]; 2nd survey n=357 [58%] and just over half were health or social care practitioners (1st survey n=365 [59%]; 2nd survey 345 [56%]. A large majority of respondents indicated a high level of confidence with digital technology (1st survey n= 497 [82%]; 2nd survey n=497 [82%]).

(Table 2 here)

Stage 5: Priority setting workshop

A total of 27 participants attended, 14 with personal experience of mental health problems, three family members/carers, and 15 health and social professionals (participants could fall into more than one category). The top ten research priorities were agreed and are shown in Table 3 (the top 26 are shown in Appendix 5).

(Table 3 here)

Top 10 research priorities

Five of the final top ten research priorities were also included in the top ten ranked questions in the interim prioritisation survey (see Table 3). The top ranked research question: 'What are the benefits and risks of delivering mental health care through technology instead of face-to-face and what impact does the removal of face-to-face human interaction have?' was ranked both number one (#1) priority in the final workshop and the interim prioritization survey. Relatedly, two questions (ranked #3, #7) addressed the relative efficacy and safety of digital technology vs. face-to-face interventions and how best to optimize the effectiveness of digital interventions in combination with human support. Other top ten priorities focused on understanding how digital technology affected the interpersonal and communicative aspects of psychological therapies (#8) and how mental health conditions (e.g. depression) can affect engagement with digital technologies (#2). One asked whether social media can be effective in reducing social isolation in people with mental health problems (#10). Three questions in the top ten addressed health services issues, specifically whether digital technology increases access to mental health services, including groups who are underrepresented in traditional services (#6, #9), and where in clinical care pathways should digital technologies be cited to achieve the best outcomes (#4). One of the top ten priorities related to identifying the best methods to evaluate and endorse mental health apps (#5).

Discussion

If research is to be of value to decision-makers, including people with lived experience, health and social care providers and health care commissioners and policy-makers, the identification and framing of these questions needs to involve the people affected by these decisions. The top ten research priorities for digital technology in mental healthcare, reached by consensus between people with lived experience of mental health problems, their families and carers, and health and social care practitioners, demonstrate important uncertainties and gaps in the evidence-base, identifying priorities for future research. A key area of uncertainty concerned the relative efficacy and safety of digital mental health interventions compared to traditional face-to-face care. While there is some existing evidence to support the equivalence of guided (remote therapist supported) internet-delivered CBT (iCBT) compared to face-to-face treatment for depression and anxiety there are still very few studies for other mental health conditions, or in children and young people. There is also limited evidence of comparisons to face-to-face treatment for new forms of digital interventions such as ecological momentary interventions (EMIs) delivered by smartphones or virtual reality or for the effectiveness of blending iCBT with face-to-face treatment.[36-38]

An important limitation of the existing evidence-base for digital interventions compared to face-to-face treatment is the highly selected nature of the samples recruited to clinical trials, including participants willing to be randomised to either intervention. More pragmatic, real-world, evaluations are also needed which include patient populations with a range of preferences for digital interventions, face-to-face treatment or a combination of the two in the form of 'blended' interventions[39], and where technologies are embedded into clinical care pathways.[9] From a policy perspective, there can be an assumption that the main benefits of digital mental health interventions lie in widening access and increasing health service efficiencies rather than in greater treatment efficacy, with face-to-face interventions still regarded as the 'gold standard'. One of the consequences of this view is that the public may feel that these are being offered 'second class' interventions, which in turn could negatively affect preferences and expectancies. Hence, research establishing therapeutic equivalence, or even superiority, would be critical to underpinning public trust and confidence in digital interventions.

The PSP top ten research priorities reflect uncertainties about the mechanisms of action of digital interventions, in particular their impact on the therapeutic alliance and concerns about the impact of removing the 'human' aspects of face-to-face treatments. Although it is often assumed that lack of therapeutic alliance is responsible for poor engagement and adherence with digital mental health interventions, we did not find any research that has addressed this question. Interestingly, where therapeutic alliance has been assessed in guided iCBT it appears equivalent to face-to-face treatment, even in the absence of visual or audio communication.[40] These identified top ten research priorities raise a fundamental question about the nature of the therapeutic relationship

as an agent of change in the next generation of digital interventions using artificial intelligence, 'chatbots' and 'virtual human' therapists.[41]

The top ten research priorities demonstrate the need to understand whether certain groups of people particularly benefit from the availability of digital technology in mental healthcare, with the aim of personalising interventions and improving outcomes. Research is needed to understand how different user characteristics and symptoms including mood, anxiety and cognitive functioning affect uptake, adherence and outcomes for digital interventions. For example, users with depression may find it difficult to complete interventions that require sustained concentration. On the other hand, users with social anxiety or agoraphobia, or with conditions associated with shame and stigma such as alcohol and substance misuse disorders or bulimia nervosa, may find it easier to engage with digital interventions compared to face-to-face therapy.[42]

A key question identified in the top ten priorities is whether the promise that digital interventions can increase reach and access to treatment for underserved groups is actually realised in practice. This requires health services research to investigate the reach and uptake of digital technology interventions in different populations. Research is also needed on how to make technologies more engaging and easier to use for those people who lack confidence with technology and have low levels of digital literacy. This requires research in the area of human factors and human computer interaction (HCI) focussing on engagement and user experience.[21] The question of where digital technologies, including decision-aids, are best placed in clinical pathways and workflows is particularly relevant for wearables and smartphones that generate 'digital phenotypes' with the aim of predicting relapse and supporting early intervention.[7, 9]

The top ten priorities also identified the need to develop faster, robust and proportionate research methods to evaluate the safety, usability and effectiveness of mental health apps.[7, 21] Finally, harnessing the potential of social media, for reducing social isolation in people with mental health problems, as well as mitigating its risks, was identified as a priority for research.[43]

This is the first JLA PSP to focus explicitly on digital technology in healthcare, and the first PSP in mental health not to focus on a specific condition (e.g. schizophrenia, bipolar disorder, depression). The breadth of the intervention (digital technology) and the broad clinical area (i.e. all mental health conditions) meant that submitted questions (raw suggestions) tended to focus on general issues, or overarching themes, rather than on the effectiveness of a specific digital technology intervention for a particular condition. Where a more specific question was submitted, these tended to be ranked lower than more generic questions in the interim prioritisation. Although this may be viewed as a limitation, it also reflects the deliberate composition of the PSP and sampling frame that prioritised user and clinical needs over technology-driven research.

Over six hundred people contributed to both the initial question-gathering survey and the interim prioritisation, balanced between service users and health care practitioners. A strength of the study was the use of robust JLA PSP methods which have been replicated internationally in other healthcare domains.[27] The survey respondents were broadly representative of the UK population with respect to location and ethnicity.[44] The ethnic and gender mix of our respondents was also identical to that of people accessing talking therapies (IAPT services) for common mental health problems in the UK.[45] Over two thirds of respondents were female, which reflects the greater prevalence of common mental health problems in women and the tendency for more women than men to respond to JLA surveys. The majority of participants were confident users of digital technology which replicates findings in the UK population as a whole[46] and we found a similar high degree of confidence in internet use among our respondents compared to other surveys in healthcare settings of service users experiencing common mental health problems.[47] We acknowledge that the use of online survey methods may have excluded those less confident with digital technology, and hence we held five national face-to-face workshops with groups identified as less confident with digital technology. However, by using online survey methods we had the advantage of reaching a widely geographically dispersed population, including the majority of people with common mental health problems who fail to access traditional mental health services.[5] A limitation of the study is that while we recruited participants representative of the UK population, the results may not be generalizable to other countries with significantly different socio-demographic composition, healthcare systems and patterns of internet usage, or to sub-populations including specific ethnic groups, children or the elderly. Hence, we recommend the replication of this JLA PSP methodology to establish research priorities for digital mental healthcare in other counties or specific populations of interest.

Following the publication of the JLA PSP top ten research priorities for digital technology in mental healthcare, the UK's National Institute of Mental Health (NIHR) Evaluation Trials and Studies Co-ordinating Centre (NETSCC) will begin the process of translating the top ten priorities into researchable questions for NIHR research calls. We intend to audit the uptake of these JLA PSP research priorities in NIHR researcher-led applications and commissioned calls. Globally, this study and these service user and practitioner-driven

priorities, generated via robust JLA PSP methods, should support a growth in user-driven research in digital technology for mental health. For the potential for digital mental healthcare to be realised, the key challenge will be to build the evidence-base for digital technology interventions and tools that incorporates the voice and priorities of mental health service-users and practitioners.

Contributors
CH, SS and LS wrote the manuscript. CH, SS, RC and BD finalised, edited and submitted the final version of the manuscript. CH, LS, RC, VB, DB, KC, KE, TAG, TK, MR, LR and AT substantially contributed towards the study in steering group meetings, and critically revised the manuscript for content accuracy, provided suggestions and approved the final version of the manuscript and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Declarations of interest
AT is Managing Director of the National Elf Service; a digital mental health platform. The other authors declare no conflicts of interest.

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